Enablers and Inhibitors of Leveraging Analytics for Digital Business Transformation

Revised Synopsis

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Doctor of Philosophy in Management

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Section I

Introduction

Digital technologies – and the ways we use them in our personal lives, work and society – have changed the face of business and will continue to. This has always been so but the pace at which it is happening has accelerated post the year 2000 and now these changes are happening faster than the pace of transformation in business organizations. As a result by the end of 2017, two-thirds of the CEOs of the 2000 largest global companies will have digital transformation at the center of their corporate strategy (International Data Corp., 2015).

Digital Business Transformation is the profound and accelerating transformation of business activities, processes, competencies to fully leverage the changes and opportunities of digital technologies and their impact across society in a strategic and prioritized way. Digital transformation affects both individual businesses and whole segments of the society, such as government, mass communications, art, medicine or science.

Causes of Digital Business Transformation

- ❏ Technological innovations: How technology and innovation is used and adopted by customers, partners, competitors and various stakeholders.
- ❏ Customer behavior and demands: may not become a direct reason but technologies often enable or causes transformation when they solve business challenges.
- ❏ Ecosystem-induced: Economical changes, demands from digitally developed business partners who want the organization to adapt, or regulatory changes.

Digital Business Transformation is an organizational change journey to adopt digital technologies and business models to improve performance. It involves challenging the assumptions that have underpinned prior success, and stress-testing the ways in which companies deliver value to customers. A typical organization undergoes a gradual metamorphosis which includes (but is not limited to) largely three areas namely Transforming Customer Experience; Transforming Operating Processes and Transforming Business Models. Currently, the following technologies are most significantly leveraged for digital business transformation: Analytics, Mobile, Cloud Solutions, Social Media and the Internet-of-Things.

In this study we aim to identify the enablers and inhibitors of leveraging analytics as a tool for digital transformation. On the basis of these enablers and inhibitors a conceptual framework will be created to demonstrate how these enablers and inhibitors impact the digital transformation of an organization. By using questionnaires and interviews we will collect opinion of mid - to senior level managers and industry experts to validate the framework. The research will be used to further create a strategic framework for leveraging analytics for effective digital transformation.

1.1 Digital Transformation in India

India's digital story is all about growth – massive growth. Digital transformation is now a primary agenda for C-suite executives in India. They are clearly seeing the growing signs of digital opportunities as companies quickly adapt to the changing market requirements. According to a study by leading IT services provider, Cognizant "the 74% companies surveyed in India are already on their way to digitally transforming their business, while 26% plan to embark on the transformation journey over the next 12-24 months. They are already experiencing an average 8% revenue growth as a direct result of their digital transformation efforts, and they expect that to reach nearly 14% by 2017."

A key role in India's digital transformation has been the IT industry. It contributes to nearly 9.5% of India's GDP and is the largest private sector employer, generating some 3.5 million direct jobs, and over 10 million indirect jobs. At the end of 2014, India had 227 million Internet users, compared to 665 million in China. Fewer than two out of every five Indian businesses had an online presence compared to almost two-thirds of firms in China.

E-commerce and digital start-ups are important components of the digital landscape of a country. However, the slow pace of improvement of the quality of basic infrastructure — expressways, logistics, storage, postal delivery system and reliable supply of electricity — have hampered the growth of e-commerce in India. And the excessively cautious approach of Indian regulators towards disruptive technological innovations such as mobile money or ride-sharing services has made it difficult for digital start-ups to enter new markets and achieve scale.

At a World Bank event (October 2015) in Washington DC titled 'Digital India: Transforming India into a digitally empowered nation' Ram Sewak Sharma, Chairman of Telecom Regulatory Authority of India (TRAI), laid out three key elements of the Digital India program and vision, namely:

- Digital infrastructure as a utility to every citizen,
- Governance and services on demand, and
- Digital empowerment of citizens

The road ahead

Clearly, India's challenge to becoming a digital economy remains formidable. The government has announced a slew of new initiatives: Digital India; Make in India; Start-up India; and innovative applications of Aadhaar such as JAM (Jan-DhanYojana-Aadhaar-Mobile trinity) and Digital Lockers. Successful and accelerated implementation of these programmes can make up for some of the lost time. But India also needs to do more by strengthening the basic foundations of its digital economy.

1.2 Introduction to (Business/Applied) Analytics

"Analytics is defined as the scientific process of transforming data into insight for making better decisions."

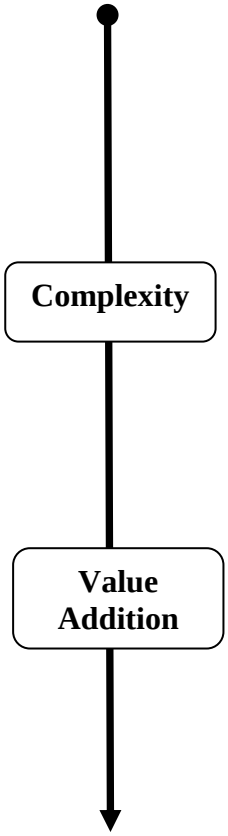
- The Institute for Operations Research and the Management Sciences (INFORMS)

1.2.1 Types of Analytics

Three terms in business literature are often related to one another: analytics, business analytics, and business intelligence. Analytics can be defined as a process that involves the use of statistical techniques (measures of central tendency, graphs, and so on), information system software (data mining, sorting routines), and operations research methodologies (linear programming) to explore, visualize, discover, and communicate patterns or trends in data. Simply, analytics converts data into useful information. Analytics is an older term commonly applied to all disciplines, not just business. A typical example of the use of analytics is the weather measurements collected and converted into statistics, which in turn predict weather patterns.

There are many types of analytics, and there is a need to organize these types to understand their uses. The Institute of Operations Research and Management Sciences (INFORMS) organization suggests for grouping the types of analytics. These types of analytics can be viewed independently. For example, some firms may only use descriptive analytics to provide information on decisions they face. Others may use a combination of analytic types to glean insightful information needed to plan and make decisions.

According to Gartner (IT Glossary), "Business analytics is comprised of solutions used to build analysis models and simulations to create scenarios, understand realities and predict future states."It includes data mining, predictive analytics, applied analytics and statistics, and is delivered as an application suitable for a business manager.

	**Descriptive Analytics**	The application of simple statistical techniques that describe what is contained in a data set or database. Example: An age bar chart is used to depict retail shoppers for a department store that wants to target advertising to customers by age.
	Predictive Analytics	An application of advanced statistical, information software, or operations research methods to identify predictive variables and build predictive models to identify trends and relationships not readily observed in a descriptive analysis. Example: Multiple regression is used to show the relationship (or lack of relationship) between age, weight, and exercise on diet food sales. Knowing that relationships exist helps explain why one set of independent variables influences dependent variables such as business performance.
	Prescriptive Analytics	An application of decision science, management science, and operations research methodologies (applied mathematical techniques) to make best use of allocable resources. Example: A department store has a limited advertising budget to target customers. Linear programming models can be used to optimally allocate the budget to various advertising media.

The purposes and methodologies used for each of the three types of analytics differ, as can be seen in the table above. These differences distinguish analytics from business analytics. Whereas analytics is focused on generating insightful information from data sources, business analytics goes the extra step to leverage analytics to create an improvement in measurable business performance.

Whereas the process of analytics can involve any one of the three types of analytics, the major components of business analytics include all three used in combination to generate new, unique, and valuable information that can aid business organization decision-making.

1.2.2 Role of Analytics in Business

Elizabeth, Hugh (2013) have laid out the importance of dynamic capabilities in e/digital business transformation. Digital is characterized by rapid changes and in such markets managers can no longer rely on the resources that they have assembled to provide their extant competitive position. Instead they must be able to combine resources in new ways, gain additional resources and dispose of legacy resources, and to do this repeatedly and rapidly if they are to compete successfully. Evan Stubbs (2011) in his book ***The Value of Business Analytics: Identifying the Path to Profitability*****, says that when executed correctly, business analytics supports strategic planning, gives a competitive advantage and delivers a tactial value**. For an effective business transformation the business requires its managers to determine why things are happening, what more can occur in future and what is the best course of action. Here analytics and its ability to transform data and information to actionable insights gains paramount importance.

1.2.3 Maturity of Indian Analytics Market

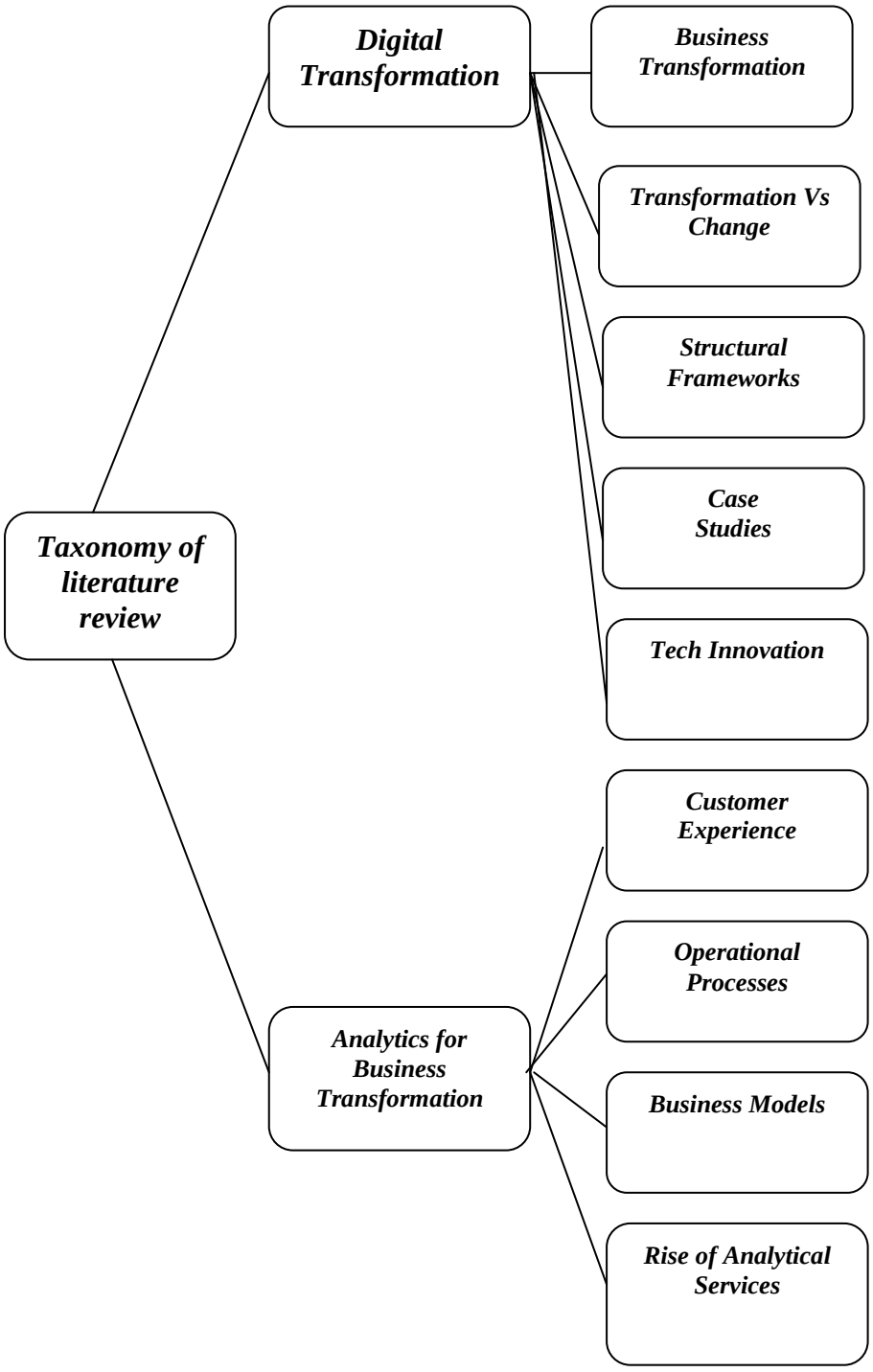
According to a report by financial services firm Avendus Capital global data analytics outsourcing market in 2012 stood at $500-500 million in 2010, of which Indian service providers delivered $375 million. This accounted for 19 per cent of India's $2 billion offshore knowledge services (KPO) market. By 2015, the data analytics market in India is expected to reach $1.15 billion to become 21 per cent of the overall Indian KPO market opportunities of $5.6 billion.

Organisations are increasingly 'competing on analytics' based on Insights from integrating institutional data, social media data, and machine data. Analytics solutions have matured from business intelligence and reporting into the realm of predictive and prescriptive analytics such as forecasting, scenario planning, simulation, optimisation, complex risk modeling, Natural Language Processing etc. The industry is enhancing capabilities and moving towards productised analytics solutions by embedding domain expertise, understanding of customer business and deploying deep analytics expertise. The Industry is offering solutions spread over industries such as Agriculture, Banking, and Mining to government agencies. Many local government agencies, on a very positive note, have been early adopters of analytical solutions to provide better citizen centric services.

Section II

2.1 Review of Literature

In this section, we present a review of the relevant literature in the current area of research. A taxonomical view of the literature review conducted in this synopsis is given in figure below:



2.2 Digital Business Transformation

2.2.1 Business Transformation Process

Thiscategorycovers research which talks about business transformation, the methodology and implementation scenarios. Manganelli, et al, (1995) created a handbook which can act as a step-by-step guide to business transformation. AUhl, MLA Gollenia (2012) have provided an integrative Business Transformation Management Methodology with an emphasis on the balance between the rational aspects of transformation and organization level readiness for transformation. McAdam (1996) has proposed a applied business process improvement methodology which will enable existing business improvement related initiatives to be integrated and refocused on business/ customer needs. Elzinga, et all, (2002) worked with several organizations and have given a step-wise model for Business Transformation which encompasses methods employed in industry from incremental improvements.

2.2.2 Business Transformation vs. Change Management

Articles in this category cover structural differences between the Business Transformation process and the Change Management Process. Ron Ashkenas (2015) states that change management is for finite initiatives not cutting across the organization while transformation is a portfolio of intersecting initiatives. Radziwill (2015) has highlighted that leaders seem to be focused more on "surviving and thriving" in the midst of rapid and disruptive innovation, which enhances the importance of transformation.

The difference between change management and business transformation is one of degree. If the business needs a major overhaul it will no longer be enough to carry out a process of continuous improvement of the type that can be delivered through a change management process. We may need to carry out some substantial "root and branch" changes to the business, even if it causes some short term disruption. Such changes come under the heading of Business Transformation.

2.2.3 Structural Frameworks

This category proposes broad structural frameworks of digital business transformation. Articles in this category are written by scientists, global consulting practice leaders who produce thought leadership. The articles include research surveys at large number of companies to understand how managers can utilize technology to redefine their business (Westerman, et al, 2014), conceptual frameworks for digital business transformation covering what to transform, why to transform and how to transform (Wade, 2015) and analytical frameworks to evaluate business models and strategies (Chung- Shang Lee, 2001)

2.2.4 Case Studies

Thiscategory of researchers study a single organization or a single industry and evaluate the process of digital transformation. Articles can include regional perspectives (Molla, Bhalla, 2014), (Mark Warschaueral, 2011), (Hyun Jeong Kim, et, al, 2007), individual industry focus (Coile, Russell C., Jr., 2016) and introduction of conceptual frameworks grounded in the reality of the change within an organization (Kathy Cowan-Sahadath, 2010).

2.2.5 Technological Innovation for Digital Transformation

This category focuses on reviewing the technological innovation and trends that drive digital Transformation. Studies include how organizations pay if they miss the digital transformation opportunity (Lucas, Goh, 2009), Digital Storytelling (Rubin, 2009), Big Data (Gantz, Reinsel, 2011) and (Schönberger, Cukier, 2013), and how IoT will drive the digital transformation (Bartels, 2015). Articles in this category are produced by authors who are technology evangelists and review latest technology and its ability to help a business transform its digital capabilities.

2.3 Analytics as a driver for Digital Business Transformation

2.3.1 Analytics for Transforming Consumer Experience

Articles in this category focus on identifying analytical tools and techniques which can be used by a business for transforming their consumer experience. Articles and papers in this category include standard metrics to measure customer satisfaction (Gupta, 2016), analytics for customer engagement (Bijmolt, et, al, 2010) and analytics powered mobile applications (Minelli, Lanza, 2013).

Westerman, et al, (2014) in their book *Leading Digital: Turning Technology Into Business Transformation* state that winning companies spend time in understanding customer behavior and design the ‘Customer Experience’ from inside - out, use digital technologies to collect data, put customer data and the analysis at the heart of ‘Customer Experience’ and continuously push to seamlessly mesh the digital and physical experience for their customers.

2.3.2 Analytics for Transforming Operational Processes

This category talks about the steps taken by organizations to upgrade their legacy systems to fully leverage digital options or substitutions. Articles and papers include process digitization (Lang, et, al, 2015) to reduce burden from employees, and using digitization and analytics to control quality, cost, and accessibility (Tarinverdi, et al, 2011), worker enablement via integrated facility management (Maureen, 2016) and digital performance management (Schläfke, et al, 2012) and (Melchart, et al, 2004).

Westerman, et al, (2014) in their book *Leading Digital: Turning Technology Into Business Transformation* state that winning companies have strong digital capabilities in their processes which creates strong competitive positioning. They suggest the following way for a strong

operational transformation: Organizations should strive for a strong digital platform and continuously look for inefficiencies in business processes by measuring, benchmarking, improving and then measuring again.

2.3.3 Analytics for Transforming Business Models

Articles in this category cover how modifications are made to transform the legacy business models. Building blocks of transformation are digital modifications to the business (Thakur, 2013) and creation of new digital businesses which support analytical decision making. Adopting analytical capabilities coupled with integrated information frameworks is allowing businesses to transform their business models to gain global synergies by measuring, benchmarking, monitoring change and again measuring their progress. New digital operating models are becoming popular like the global shared services for finance, HR, Manufacturing and Design (N Su, et al 2009) which have analytics embedded at the core of their operations. Berman (2011) suggests that engaging with customers at every point where value is created is the suggested digital business model that differentiates a customer centered business from one that simply targets customers well. Customer interaction in these areas often leads to open collaboration that accelerates innovation.

2.3.4 The rise of Analytics based services for Business Transformation

Articles in this category cover the rise of several analytics based services which support business transformation. Chen, et all, (2011) have emergence of two new service entities 1) DaaS (Data-as-a-Service) a forms of data services that aggregate and provide accesses to a wide range of data sources and 2) AssS (Analytics-as-a-Service) high value analytics services on top of 'DaaS' which may include Business Intelligence reporting, text analytics, and advanced analytics.Analytics as a Service combines the on-demand aspects of cloud computing with the democratization of information enabled by big data analytics (Mathiprakasam, 2014) Businesses are increasingly flattening decision-making hierarchies to empower more knowledge workers and become more responsive to customers. In an era where time to market is king, this customer centricity-meets-anaytics empowerment allows enterprises to continuously innovate and make more real-time decisions.

Section III

3.1 Need for Study

Prime Minister Modi envisions transforming our nation and creating opportunities for all citizens by harnessing digital technologies. His vision is to empower every citizen with access to digital services, knowledge and information. He has laid emphasis on National e- governance plan and has gave approval for Digital India – A programme to transform India into digital empowered society and knowledge economy. Digital India is an ambitious programme of Government of India projected at Rs. 1,13,000crores. This will be for preparing the India for the knowledge based transformation and delivering good governance to citizens by synchronized and co-ordinated engagement with both Central Government and State Government.

The existing/ ongoing e-Governance initiatives would be revamped to align them with the principles of Digital India. It would also bring in public accountability through mandated delivery of government's services electronically. The success of Digital India is highly dependent on successful and continuous digital transformation of organizations in India. The first wave on Indian businesses has already started undergoing digitization with many public sector and private sector organizations providing digital interaction to their customers.

While the large population of our country creates large volumes of transactional data, the organizations will be collecting and storing large volumes of data rich with a wealth of information which when analyzed with caution and planning can lead to an effective digital transformation. At the same time the technological advances are creating data in multiple formats. In order to undergo a digital transformation the organizations will have to make the best use of internal data and at the same time they will have to be efficient in collecting and analyzing external data to leverage in the best interest of their business. This raises the need to explore the inhibitors and enablers in leveraging analytics for digital transformation of organizations.

3.2 Objectives of Research

The proposed thesis has the following objectives with respect to Digital Business Transformation (DBT)

Objective 1: To identify the enablers and inhibitors of leveraging analytics for Digital Business Transformation

Objective 2: To evaluate the strength of each enabler and inhibitor across industries

Objective 3: To evaluate organizational response to these enablers and inhibitors by conducting a case study on selected organizations.

Objective 4: To develop a framework of leveraging analytics for Digital Business Transformation

3.3 Conceptual Framework and Hypotheses

A business transformation is digital when it is built on a foundation of digital technology. Currently, the following technologies are most significantly associated with digital business transformation: Analytics tools and applications, including 'big data', Mobile tools and applications, Platforms upon which to build shareable digital capabilities, like cloud solutions and app marketplaces, Social media tools and applications, The Internet of Things, including connected devices and 'smart' networks (IDC, Center for Digital Business Transformation)

Together these digital technologies, often cumulatively referred to as the Internet of Everything (IoE), is defining how organizations and industries are transforming, often as a result of new technology-enabled business models

In this section, we propose a conceptual framework that depicts the key inhibitors and enablers for leveraging analytics for digital transformation of organizations.

Leveraging analytics for Digital Business Transformation

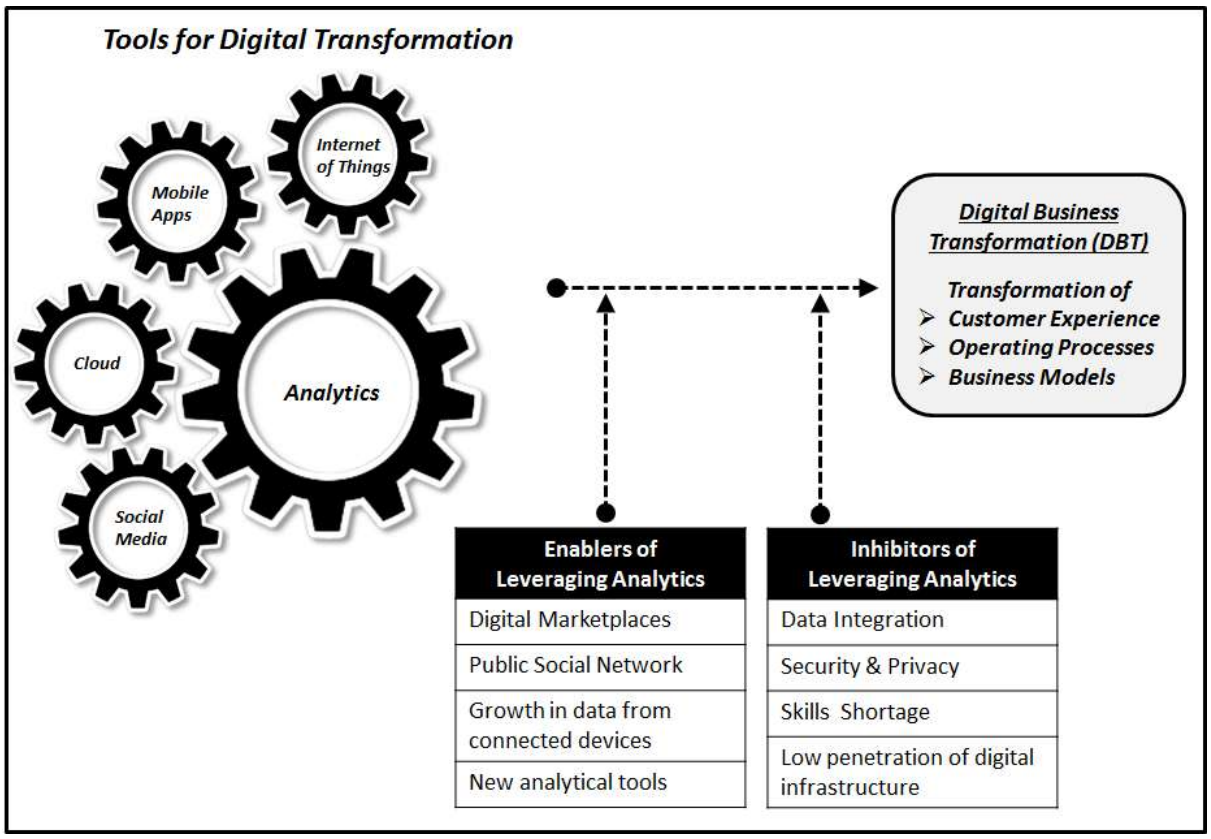


Figure 1: Leveraging Analytics for Digital Transformation: Enablers and Inhibitors

As shown in Figure 1, enablers and inhibitors which influence the use of analytics for Digital Transformation. These are elaborated below:

3.3.1 Enablers

3.3.1.1 Digital Marketplaces and Communities

Douglas F. Aldrich, in his book *Mastering the Digital Marketplace: Practical Strategies for Competitiveness in the New Economy* says that information and it's flow through IT is making a difference and separating the winners and loosers. Manufacturers compete more on their ability to connect with consumers and suppliers using IT than on their ability to produce high quality products. Retails today compete more on their ability to analyze buying patterns of their customers than on their store layouts and merchandising. Leading domestic example is a traditional seller like IRCTC who is getting into the marketplace game by running analytics on their consumer database. Marketplaces are not limited to sellers either. Marketplaces like Alibaba are making it easier than ever for business to fuel their digital transformation by finding and sourcing suppliers and manufactures of products from around the globe.

Therefore it is hypothesized: Ho1: Use of digital marketplaces and communities positively influence the use of analytics for digital transformation

3.3.1.2 Public Social Networks

Social media has witnessed exponential growth and enterprises have been able to get on board by integrating it with their CRMs. Social media has brought a paradigm shift in the way companies talk to their customers and thereby, customers have been empowered like never before. Social media will continue to play a pivotal role and its presence will only increase with the government sector using it as an active part of their governance and communication strategies to deliver better service.

Thus, it is hypothesized: Ho2: Public Social networks have a positive influence on use of analytics for digital transformation

3.3.1.3 Rapid growth in data from connected devices

An EMC Digital Universe study predicts that 10% of all digital data will be generated by network connected devices by the end of the decade. Today, network-connected devices generate about 2% of all digital data. Smart companies like GE, are leveraging this data to provide differentiated services. A GE Wind Turbine contains about 20,000 sensors that generate 400 data points per second. The sensor data is analyzed in near real time to maximize the efficiency. This data is also stored and used for deeper analytics to improve maintenance and parts replacement. Modern Wind Turbine are more efficient and have higher availability enabled by next generation analytics.

Thus, it is hypothesized: Ho3:Rapid growth in data from connected devices has positive influence on use of analytics for digital transformation

3.3.1.4 New analytical tools to analyze large volumes of data

Recent times have witnessed increase in unstructured data types such as images, video, and audio. The EMC Digital Universe study predicts 30% of all digital data by the end of the decade will be security related with the majority being images, video, and audio. These formats capture a lot of information but are not analyzed. The new set of analytics tools designed specifically to analyze large amounts of data, both structured (i.e. log data) and unstructured (images). Tools such as Hadoop, and Splunk were designed to analyze large data sets. These new analytics tools have been created through the Open Source community and have a low initial cost to get at least get started. Generation of analytical results has become affordable for big companies but smaller companies are also using these tools to find new revenue, and provide differentiated services.

Thus, it is hypothesized: Ho4: Use of new age anlaytical tools has a positive influence on use of analytics for digital transformation

3.3.2 Inhibitors

3.3.2.1 Data Integration

Dong, Srivastava, (2015) state that not only can data sources contain a huge volume of data, but the number of data sources is also rapidly exploding data sources are extremely heterogeneous in their structure and content, exhibiting considerable variety and challenge even for substantially similar entities. There are severe limitations in current infrastructure technologies that connect dissimilar systems and devices. i.e. data produced by one system or device can be understood by other systems.

Thus, it is hypothesized: Ho5: Data integration has a negative influence on use of analytics for digital transformation

3.3.2.2 Shortage of skills

A PriceWaterhouseCoopers survey of CEOs found that 25% lack the skills to make greater use of their organizations' data and that even at the highest level, a shortage remains. Another recent survey by the MIT Sloan Management Review found that 49% of respondents said they lack analytics talent. The role of a data scientist is to mine enormous volumes of data and pull out key insights. In an era where enterprise-generated data is expected to exceed 240 exabytes daily by 2020, the need for experts trained in extracting insights from data is more important than ever. We have a global talent shortage, and the demand for data scientists continues to grow rapidly, far outpacing the anemic growth in supply. Globally, demand for data scientists is projected to exceed supply by more than 50 percent by 2018.

Thus, it is hypothesized: Ho6: Shortage of skilled people has a negative influence on using analytics for digital transformation

3.3.2.3 Data Security and Privacy

Smith, et al, (2012) observed that Big Data is a new label given to a diverse field of data intensive informatics in which the datasets are so large that they become hard to work with effectively. It is not just the vast amounts of data that causes privacy and security issues. Cheap new cloud-based data collection techniques, along with powerful data processing software frameworks like Hadoop, are enabling organizations to easily mine and process Big Data. As a result, many security-compromising challenges have arrived with the large scale integration of Big Data and cloud-based data storage. Present day security applications are designed to secure small to medium amounts of data, thus they cannot protect huge amounts of data. Also, they are designed according to static data, so they also can't handle dynamic data.

Therefore, it is hypothesized: Ho7: Data security and privacy issues grow with data usage and have a negative influence on use of analytics for digital transformation.

3.3.2.4 Lagging penetration of digital infrastructure

The growth of personal computers and internet penetration has been impressive in the past few years. However, the bulk of this growth has mostly been in urban India thereby widening the gap between rural and urban India in terms of adoption of information communication technology. In 2014, the internet usage penetration in India was 18% which is forecasted to become 34% by the year 2016. While the absolute growth has been impressive, India still lags in onboarding digital citizens. A $17-billion government program to build a national optical fiber network that will connect India's gram panchayats, or village-level governments, aims to cover the entire country in three years and could be a game changer.

Therefore, it is hypothesized: Ho8: Low penetration of digital infrastructure has a negative influence on use of analytics for digital transformation..

Section IV

An overview of the proposed study

4.1Sample Design

Malhotra, Naresh K in his book Marketing Research: An Applied Orientation, 6/E, has laid out guidelines for sampling process for a large sample. The proposed thesis will follow the same as under:

Infinite Population: 'Services' and 'Industry' sections of the economyconstitute about 83% of India's GDP. Mid and senior level managers of India with at least 5 years of working experience in respective industry and working in Services (Government, ITES/BPO, Banking) and Industry (Manufacturing) will be included in sample along with representation from Experts/Consulting companies.The population being very large in size suggests the need for a sample from infinite population.The required sample size doesn't change much for populations larger than 50,000.

Sampling Technique: Sample in this research (non-probability sample) will be selected on the basis of their accessibility or by the purposive personal judgment of the researcher.

Sample size for an infinite population

- **Confidence Level:**The confidence level is the amount of uncertainty we would tolerate. True answer is the percentage we would get if we exhaustively interviewed everyone. (Typical choices are 90%, 95% and 99%)

- **Confidence Inerval (Margin of Error):**The margin of error is the amount of error that we would tolerate. If 90% of respondents answer yes, while 10% answer no, we may be able to tolerate a larger amount of error than if the respondents are split 50-50 or 45-55.Lower margin of error requires a larger sample size. (5% is a common choice)

- **Response Distribution:**For each question, what do we expect the results will be? If the sample is skewed highly one way or the other,the population probably is, too. Using 50%,gives the largest sample size.

Sample Size - Infinite Population (where the population is greater than 50,000)

$$SS = \frac{Z^2 \times (p) \times (1 - p)}{C^2}$$

SS = Sample Size
Z = Z-value[A] (e.g., 1.96 for a 95 percent confidence level)
P = Percentage of population picking a choice, expressed as decimal[B]
C = Confidence interval, expressed as decimal (e.g., .04 = +/- 4 percentage points)

Calculated Sample Size:

Sample Size = ((1.96)^2 * 0.5 * (1-0.5)) / ((0.05)^2)

Sample Size = 384

Z = 1.96 @ 95% Confidence
P = 0.5
C = 0.05 (5%)

4.1.1Sample Collection

To collect opinion and responses on Analytics and Digital Business Transformation, the cities Delhi/Gurgaon, Hyderabad and Bangalore have been selected for administering a questionnaire.

- All these cities hold rank in LinkedIn's Global Tech Skill IT Survey of 2014.
- All these cities are leading cities globally in terms of "*percentage of new residents with tech skills*".
- Distribution of sample in industry sectors has been done as per contribution of industry sector to GDP. Services ~51% and Manufacturing ~30%.
- The rest ~19% has been allocated to Consulting/Experts (not in proportion to GDP contribution).

Industry	Sector	Gurgaon / Delhi	Hyderabad / Bangalore	Share in Sample	Total
Services	Government	33	33	17%	66
	ITES/BPO	33	33	17%	66
	Banking	33	33	17%	66
			Sub-total	**51%**	**198**
Manufacturing	Manufacturing	58	58	30%	116
Others	Consulting/Experts	36	36	19%	72
		193	**193**	**100%**	**386**

4.1.2 Data collection instruments

- **Primary Data:** Online questionnaires and telephonic/personal interviews (both structured and unstructured) will be used for data collection

- **Secondary Data:** Internet research, surveys, articles, government resources, libraries, journals and archives will be used to collect secondary data related to this topic.

4.1.3Statistical techniques

- To check the internal consistency of questionnaire, Cronbach's alpha will be used. It is a measure of internal consistency, that is, how closely related a set of items are as a group.

- Statistical procedures like correlation and regression will be used to understand the relationships between variables which enable or inhibit Digital Business Transformation.

- Descriptive statistics, T-Test, F-Test, ANOVA, and other relevant statistical techniques will be used to further analyze data.

4.1.4 Statistical tools

Statistical computing softwares commonly available for data analysis are as given below. The proposed research will use these tools extensively to ensure adequacy and correctness.

- MS Excel
- R
- SAS
- Minitab
- Matlab

4.1.5 Case Study

To evaluate how organizations respond to these enablers and inhibitors by conducting a case study on a selected organization will be conducted.

The selected organization will be as follows:

- DayalbaghEducational Institute, Agra

Methodology will be to collect information and assess the maturity of digital transformation followed by recommendations to enhance the same.

SECTION V

Chapterization

The proposed thesis will contain the following chapters:

Chapter 1 – Introduction

Chapter 2 – Review of Literature

Chapter 3 – Enablers and Inhibitors of Leveraging Analytics for Digital Business Transformation

Chapter 4 – Research Methodology

Chapter 5 – Data Analysis

Chapter 6 – Results and Interpretations

Chapter 7 – Case Studies: How organizations respond to enablers and inhibitors of using analytics for DBT

Chapter 8 – Strategic framework: Leveraging analytics for Digital Business Transformation

Chapter 9 – Future prospects and limitations of research

Chapter 10 – References

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